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Analysis of word-final dysfluencies in conversations of a child with Autism: A treatment case study

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Abstract

Word final dysfluencies (WFDs) are a type of dysfluent repetition or prolongation occurring at the end of words. The repetitions may include single sound repetitions or rhyme repetitions. A pause may or may not be present before a repetition. This study analyzed the use of WFDs in a school-age male with Autism during conversational speech. The frequencies of these WFDs were analyzed according to multiple variables: utterance complexity, utterance length, interest of topic, and initiation of utterance. Higher percentages of WFDs were present for sentences of increased length and/or complexity, as well as for those sentences related to high-interest or participant-initiated topics.

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1. Introduction

In typical stuttering, repetitions of sounds tend to occur in the initial position of words (e.g., “l-l-light”). Although such repetitions can occur in the middle or at the end of a word, it is more common for them to occur on the first sound of a word (ref). Clinically and in the research literature, repetitions at the ends of words have been identified among children with no diagnosis (Mowrer, 1987; McCallister, & Kingston, 2005), children on the autism spectrum (Hietala & Spillers, 2005; Sisskin, 2006; Plexico, Cleary, McAlpine & Plumb, 2010; Tetnowski, Richels, Shenker, Sisskin & Wolk, 2012), children with Attention Deficit Hyperactivity Disorder (ADHD) (Scott, Grossman, Abendroth, Tetnowski & Damico, 2006), and children with other neurological impairments (Ardila & Lopez, 1986; Bijeveld, Lebrun & Van Dongen, 1994; Rosenfield, Viswanath, Callis-Landrum, Didanato, & Nudelman, 1991; Stansfield, 1995; Van Borsel, Geirnaert, & Van Coster, 2005; Van Borsel, Van Coster, & Van Lierd, 1996).

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Although these repetitions may include repetitions of single sounds of words (e.g., “light-t-t-t”), other patterns of repetitions have been noted, such as those of the entire rhyme portion of a word (e.g., “light-ight”), or those containing a pause before repetitions and continuation of thought (e.g., “I will need to turn on the light (pause) ight to see that clearly”) (Sisskin, 2006). Currently these patterns are referred to as word final dysfluencies (WFDs) in the literature.

Previous research has analyzed the characteristics of the WFDs in typically developing children (McCallister & Kingston, 2005; Mowrer, 1987), in a child with a traumatic brain injury, (Van Borsel et al., 1996), and in an adult male with neurofibromatosis type I (Cosyns, Mortier, Corthals, Janssens, & Van Borsel, 2010). These studies analyzed WFDs in terms of complexity of the word containing WFDs (monosyllabic vs. polysyllabic), position of the word containing WFD in the context of the sentence, frequency of occurrence of individual phonemes as WFDs, type of word containing WFDs (function vs. content words), presence of a pause following WFDs, and number of iterations of the WFDs. No study to date has identified the patterns of occurrence of WFDs within the context of spontaneous conversation in a child with Autism.

1.1. Aims of study

The purpose of this case study was to analyze the context of WFDs in the conversational speech of a boy with Autism between the ages of 10 years, 10 months and 11 years, 3 months. WFDs were analyzed to determine if there is a higher frequency of WFDs in: a) complex sentences; b) utterances longer than the participant’s average utterance length; c) utterances that were initiated by the participant compared to the utterances that were in response to questions; d) utterances that are of high interest to the participant compared to low interest topics.

2. Methods

2.1 Participant

The participant was a school-age boy with Autism. The participant exhibited WFDs, in particular, repetitions of rhyme portions of words (“light-ight”) and pausing between repetitions (“light..pause..ight”). The speech-language therapist (SLT) at the participant’s elementary school referred him to the university speech, language, and hearing clinic where this study was conducted. The participant was receiving speech therapy in the school setting for pragmatic language once a week for 30 minutes. No interventions for WFDs were provided at school.

2.2 Procedures

The participant attended the university clinic once a week for forty-five minutes over the course of 23 weeks. All therapy sessions were recorded using the Landro video system. The participant’s mother provided informed consent for participation in the study and use of recording devices. Each session was conversation-based and led by a speech-language pathology graduate student clinician who was supervised by a licensed and certified SLT. The conversations were of varying topics led by either the clinician or the participant.

Each therapy session began with a 5-minute baseline conversation and ended with a 5-minute probe conversation. Data for this study was taken from a larger study focusing on clinician training and treatment of WFDs. Data for the present study was collected from eight of the therapy sessions where the participant exhibited the largest number of WFDs, in order to provide the most robust sample for analysis. Both the baseline and probe conversations were analyzed for this study. The remaining 35 minutes entailed conversation-based interactions between the clinician and the participant.

2.3 Measures

Each 5-minute baseline and 5-minute probe conversation was transcribed word for word and coded for the presence of WFDs during playback from the recorded session. The conversation was broken into conversation units (C-units) following the methods of Strong (1998). A C-unit is defined as a main clause (subject and predicate) with all subordinate clauses attached. The number of words in each C-unit was calculated. Interjections, words in abandoned utterances, and words in revisions were not counted (Strong, 1998). The average length was determined by finding the median length of utterances from 6 randomly chosen baseline and probe data samples from the beginning, middle, and ending sessions of therapy. Median was chosen as a representation of average values rather than mean to avoid skewness. The median length was determined to be 9 words.

Each C-unit was analyzed for the following four variables defined in Table 1: a) utterance complexity, b) utterance length, c) interest of topic, and d) initiation of utterance.

Table 1. Definitions of C unit variables

<i>Variable</i>	<i>Definition</i>
Complex utterance	The utterance is grammatically complex (contains 1 independent clause and one subordinate clause) or compound (contains at least 2 independent clauses combined by a conjunction).
Non-complex utterance	Utterance contains one independent clause, no subordinate clauses.
Longer-length utterance	The utterance contained more than 9 words.
Average-length utterance	The utterance contained 9 words or less.
High interest topic	The topic was chosen and expanded upon by participant.
Low interest topic	The topic was chosen by researcher and not expanded upon.
Initiated utterance	The utterance was not a response to a question.
Not initiated utterance	The utterance was in response to question by researcher.

The total C-units were then divided into either presence of the variable (“complex,” “longer,” “high interest,” or “initiated by participant”) or absence of variable (“non-complex,” “average,” “low interest,” or “not initiated by participant”).

3. Results

The data were analyzed according to the various variables as shown in Figure 1. The complex C-units contained 35.1% of WFDs while the non-complex C-units contained 5.17% of WFDs. The longer-length utterances C-units contained 44.96% of WFDs while the average-length C-units contained 7.14% of WFDs. The topics of high-interest C-units contained 26.19% of WFDs while the topics of low-interest C-units contained 1.54% of WFDs. The initiated C-units contained 36.59% of WFDs while the non-initiated C-units contained 7.31% of WFDs. All four variables show a significantly higher percentage of occurrences of WFDs with the presence of the variable. This suggests there is a higher percentage of WFDs present when the C-units were complex, longer in length, of high interest, and initiated by the participant.

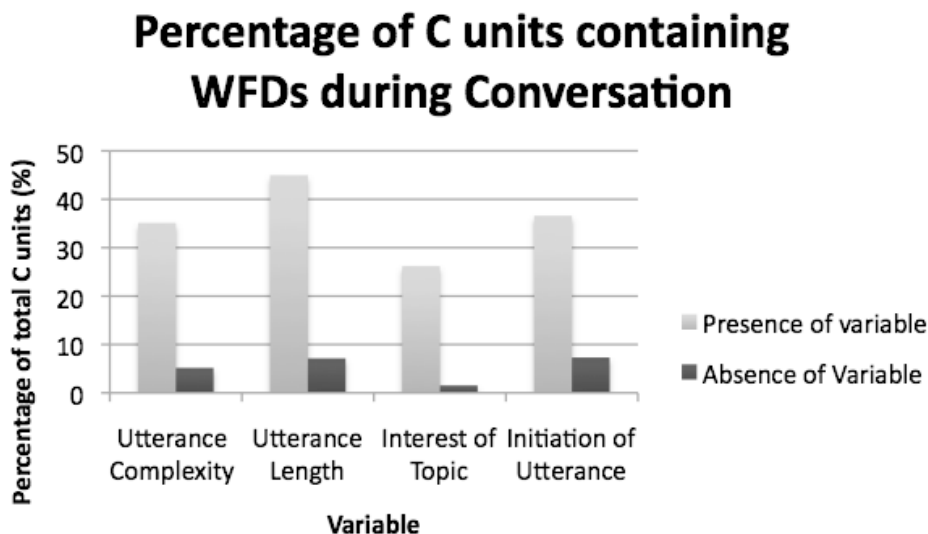


Fig. 1. Percentage of C units containing WFDs during conversation

Figure 2 displays the total C-units divided into either presence of the variable (“complex,” “longer,” “high interest,” or initiated by participant) or absence of variable (“noncomplex,” “average,” “low interest,” or not initiated by participant). The number of C-units containing WFDs for each variable was identified. A higher number of WFDs for each variable occurred during presence of the variable, even if there was a lower number of C-units with the variable present than the number of C-units with the variable absent.

Presence of Variable	Presence of Variable containing WFDs	Absence of Variable	Absence of Variable containing WFDs
Number of “complex” C units	Number of “complex” C units containing WFDs	Number of “noncomplex” C units	Number of “noncomplex” C units containing WFDs
191	67	232	12
Number of “longer” C units	Number of “longer” C units containing WFDs	Number of “average” C units	Number of “average” C units containing WFDs
129	58	294	21
Number of “high interest” C units	Number of “high interest” C units containing WFDs	Number of “low interest” C units	Number of “low interest” C units containing WFDs
294	77	130	2
Number of C units initiated by participant	Number of C units initiated by participant containing WFDs	Number of C units not initiated by participant	Number of C units not initiated by participant containing WFDs
164	60	260	19

Fig 2. Presence of variable, presence of variable with WFD, absence of variable, and absence of variable with WFDs.

4. Discussion and conclusions

In the present study, the authors investigated the frequency of occurrence of word final dysfluencies within conversational speech of a 12-year-old boy with Autism. The relationship between the presence of WFDs according to utterance complexity, utterance length, interest of topic was examined. There was an increase in percentage of WFDs per C-unit when the utterance was complex, longer, of high interest, and initiated by the participant.

In addition to the presence of each variable results in increased WFDs, there appeared to be an interaction between variables resulting in WFDs. For example, the C-units defined as “complex” tended to be longer in length, giving more opportunity for WFDs to occur. The “longer” C-units often occurred when the participant was enthusiastic during conversation and therefore was speaking on a high-interest topic. When a topic was chosen that was “high interest” to the participant, he was more likely to initiate utterances within that topic. The majority (98%) of C-units determined to be “low interest” were also not initiated by the participant. Last, when the participant initiated the utterance during conversation, he was not responding to a direct question, but was telling a story or describing something of interest. This led to longer utterances and higher rates of “high interest” which provided the participant with more opportunities to produce WFDs. Therefore, although the presence of all variables increased the occurrence of WFDs in the participant’s speech, more detailed analysis of the specific interactions between the four variables needs to be completed to better parse out these interactions.

Although the longer C-units had more words in each, the total number of words was higher for the combined “average” C-units than the total number of words for combined “longer” C-units. The total “average” C-units had less than half the number of WFDs compared to the number of WFDs displayed in the “longer” C-units. Thus, in this instance it appears that increased length of individual C-units alone was a contributing factor to increased WFDs, rather than increased utterances resulting in more opportunities for WFDs to occur.

Results of this study add to the growing database of analysis of the characteristics of WFDs. The reader is cautioned on generalizing findings to a larger context due to the small sample size. In addition, further data must be gathered before definitive conclusions can be drawn.

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